DOCUMENT RESUME

ED 374 421 CS 214 471

AUTHOR Baer, Matthias; And Others
TITLE TextProF: A Metacognitive Intervention To Foster Students' Writing Ability.
PUB DATE Apr 94
NOTE 14p.; Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 4-8, 1994). Very small print in some figures may affect legibility.
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Grade 10; High Schools; *Instructional Effectiveness; Intervention; *Metacognition; Writing Achievement; *Writing Improvement; *Writing Processes; Writing Research
IDENTIFIERS Text Factors

ABSTRACT

A study examined the effectiveness of a metacognitive intervention that concentrated on eight subprocesses of writing and on executive procedures according to an "Orchestra Model" of text production. Subjects, 90 tenth-grade students, participated in the intervention which lasted for about six months and consisted of about 60 lessons. The intervention consisted of process-oriented and product-oriented training. A series of seven tests and evaluation procedures were used before and after the intervention. Results indicated that subjects in the intervention group paid significantly more attention to the analysis of the writing task and the construction of semantic deep structure. Other improvements concerned the imposition of a chronology on the semantic deep structure; the repertoire of external representation means for representing intermediate results of the text production process; and the evaluation of the evolving text. Subjects of the intervention group not only possessed more elaborate declarative knowledge, but they applied it in real writing situations as well. (A figure illustrating the orchestra model of text production and four figures of data are included.) (RS)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
M. Baer
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED 374 421

TexProF[1] - A Metacognitive Intervention to Foster Students' Writing Ability[2]

Matthias Baer, Monika Reber-Wyss, Michael Fuchs, Ueli Jurt & Thomas Nussbaum[3]

Abteilung Pädagogische Psychologie, University of Berne, Switzerland

Research supported by the Swiss National Science Foundation, Grant #11-33540.92

---

1. Abstract

During the last one and a half decades writing research has become a more and more important field in educational research (e.g. JECHLE 1992). Almost all of the writing research is related to research in metacognition (e.g. WINTER 1992). Our own research in writing (BAER 1989, 1992, BAER et al. 1993) is divided into three parts. In its theoretical part we developed a writing model which we call the "Orchestra Model" of Text Production. In the diagnosis part we investigated the nature of different text production abilities of grade 5 and grade 9 students, and of adults. It is furthermore a diagnosis of good and poor writers' differences within each of these three age groups. The study which is presented consists of an intervention that we developed on the basis of the theoretical and the diagnosis part. The theoretical part gives an idealistic understanding of the different subprocesses of writing and the coodination among them, while the diagnosis provides a realistic understanding of what writers really know of how to cope with writing tasks. Those aspects, which are to be considered as typical weaknesses, became the focus of the intervention.
In the process-oriented training of the intervention we concentrated on 8 subprocesses of writing and on executive procedures, according to the "Orchestra Model" of Text Production. The product-oriented training provided subjects with main characteristics of expository and argumentation type of text according to BONATI (1990). Different measurements show that the intervention was successful. The subjects' improvement consists of a much better declarative and procedural metacognitive knowledge of text production.

2. Theoretical Background

The "Orchestra Model" of Text Production (OMOT) consists mainly of four main components, a test component as well as an executive component (see below). While the "Executive Component" coordinates the main and test components, the component "Task Analysis" analyzes the text production task with regards to the pregiven requirements and conditions to produce the text. The

---

1 TexProF stands for Text Production Fostering.

2 Paper presented at annual meeting of American Educational Research Association (AERA) in New Orleans, LA, April 4 - 8, 1994.

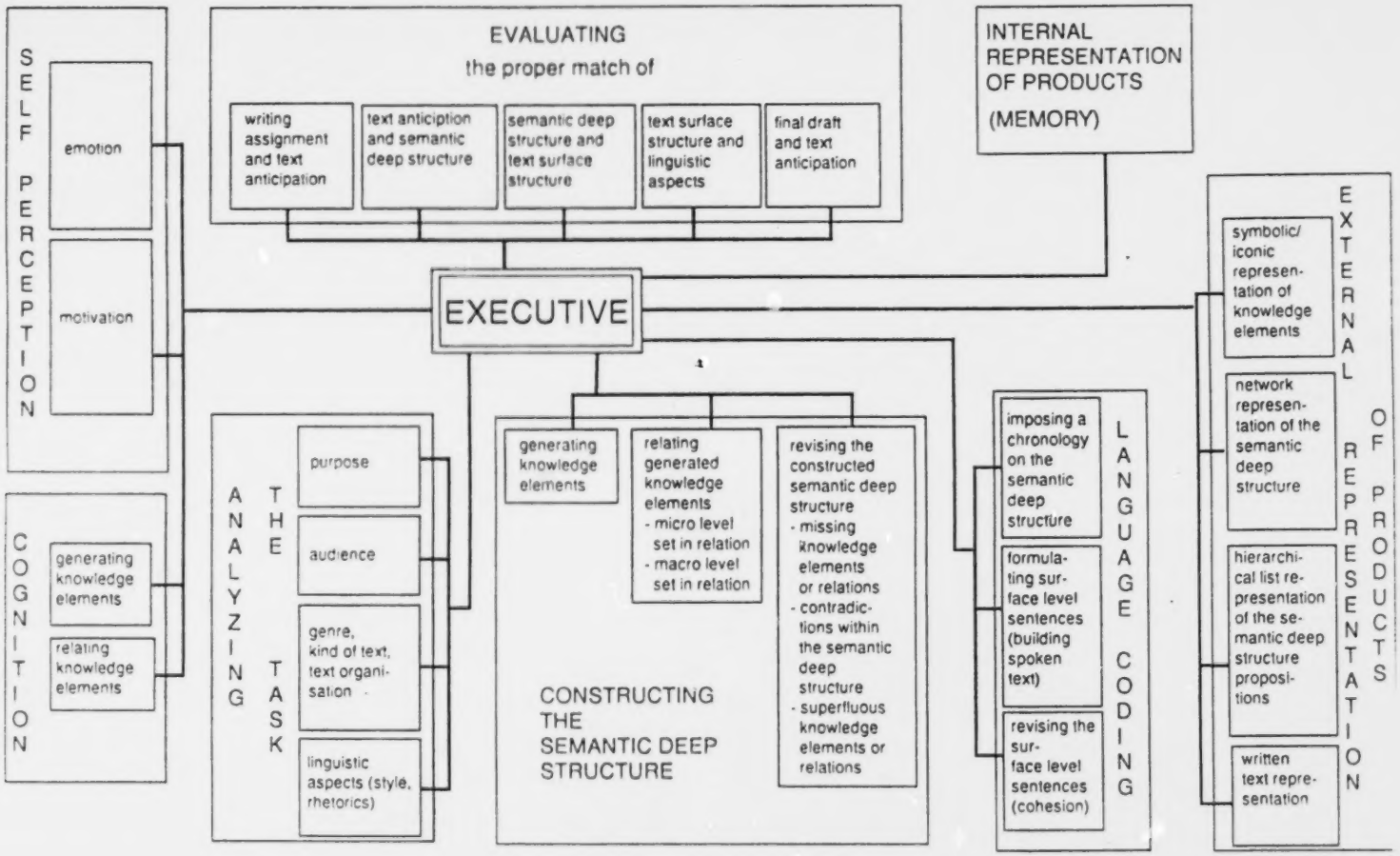
3 The authors gratefully acknowledge the contributions to this research of Armin Hollenstein, Margaretha Hofstetter, and Andreas Schmid.

CS214471

result of the latter's activity is a detector model or the anticipation of the text to-be-written. The component "Construction of the Semantic Deep Structure", on the other hand, constructs the deep structure which semantically constitutes the text. It does this by recalling suitable knowledge elements (idea generation) on the basis of the results of the task analysis from internal (memory) and external sources (illustrations, books, media etc), and by relating these elements with one another with the aid of appropriate relation concepts. The component "Language Coding and Formulating of the Surface Structure" has two functions. On the one hand, it determines the order of thoughts for the linear surface structure of the text which appears in sequences (chronology). On the other hand, it generates the correct, rhetorical-stylistic suitable surface structure of the text. The component "External Representation" represents the results of the activities of the mentioned components externally. It presents, for example, the result of the relational linking of the construction of the semantic deep structure in a network type of form; it adheres to the result of the imposition of chronology a hierarchical list of micro and macro propositions; it represents the results of the syntactizing as a sequence of linguistic surface sentences. The "Test Component" finally examines, in a variety of ways, whether conditions which have been attained at that point and those to be attained correspond. Does, for example, the detector model which functions as a text anticipation correspond to the text production task in question?

Just as the art of playing well together exists in an orchestra in order to interpret music in well-coordinated interaction between the musicians and the conductor and in the disciplined collaboration of individual musicians, so the crucial point in the outlined text production model exists in the sensible coordination of individual main components in order to generate the text product. The task of the Executive Component is to provide this coordination.

ORCHESTRA MODEL OF TEXT PRODUCTION


SELF PERCEPTION
emotion
motivation
COGNITION
generating knowledge elements
relating knowledge elements
EVALUATING
the proper match of
writing assignment and text anticipation
text anticiption and semantic deep structure
semantic deep structure and text surface structure
text surface structure and linguistic aspects
final draft and text anticipation
INTERNAL REPRESENTATION OF PRODUCTS (MEMORY)
EXECUTIVE
ANALYZING THE TASK
purpose
audience
genre, kind of text, text organisation
linguistic aspects (style, rhetorics)
generating knowledge elements
relating generated knowledge elements
- micro level set in relation
- macro level set in relation
revising the constructed semantic deep structure
- missing knowledge elements or relations
- contradictions within the semantic deep structure
- superfluous knowledge elements or relations
CONSTRUCTING THE SEMANTIC DEEP STRUCTURE
LANGUAGE CODING
imposing a chronology on the semantic deep structure
formulating surface level sentences (building spoken text)
revising the surface level sentences (cohesion)
EXTERNAL REPRESENTATION OF PRODUCTS
symbolic/ iconic representation of knowledge elements
network representation of the semantic deep structure
hierarchical list representation of the semantic deep structure propositions
written text representation

BEST COPY AVAILABLE

3. Hypotheses and Subjects

The hypothesis to be tested was whether

(1) mediation of metacognitive knowledge of writing in those domains where the students' most difficulties were spotted by the diagnosis[4],

(2) the training of executive procedures in relation to this knowledge, combined with

(3) the mediation of text structure elements of expository and argumentative kinds of text, and

(4) the training of (1), (2), and (3) in real writing tasks would

  (a) help students to gain a better understanding of how to cope with writing an argumentative or an expository text,

  (b) give students a more effective approach in handling writing tasks, and

  (c) result in higher quality of written compositions.

90 high school students (grade 10) participated in the study which lasted for about six months and consisted of about 60 lessons.

4. Contents of the Intervention

In the intervention two kinds of training were provided: a process-oriented and a product-oriented training.

The **process-oriented training** consisted of eight moduls and one executive according to the "Orchestra Model" of Text Production: (1) text anticipation modul: analyzing the writing task from the perspective of the writer's own understanding of the writing task, (2) knowledge generation modul: generating knowledge elements from memory or from external sources, (3) Set-in-relation modul: relating the generated knowledge elements with one another to produce the semantic deep structure of the text to-be-written, (4) chronology modul: imposing a chronology on the constructed semantic deep structure aimed at determining the most convincing "path through the constructed semantic deep structure" in order to linearize this structure in respect to the linear or sequenced form of the text surface structure, (5) formulating/ syntactizing modul: producing surface structure sentences in order to express the propositions of the semantic deep structure in the order of the imposed chronology, (6) test modul: testing whether the (provisional) text products produced so far correspond to the text anticipation; (7) representation modul: providing representation means for the external representation of the results of different subprocess: *iconic/symbolic representation* for representing generated ideas, *network representation* for representing the constructed semantic deep structure, *hierarchical list representation* (comparable to an outline) for representing the sequenced macro and micro propositions as the result of the imposing of a chronology on the semantic deep structure. (This representation served as an aid for producing the surface structure of the text to be represented as *written text* on a sheet of paper.); (8) revision modul: revising the produced surface structure text in relation to content and form.

[4] Those difficulties concern: (1) organization of the text production process, (2) analysis of the writing task, (3) macro level set in relation, (4) imposition of a chronology on the semantic deep structure, and (5) different subcomponents of the test component (BAER et al. 1993).

Based on students' difficulties in text production spotted by the diagnosis part of the research project (see BAER et al. 1993) the focus of the process-oriented training was on moduls (1), (3), (4), (6), (7), and on executive procedures in order to train subjects' continuous conscious switches back and forth among the subprocess of writing distinguished in the "Orchestra Model" of Text Production. To help subjects gain insight into the subprocesses of writing represented by the moduls and the executive, as well as to gain insight into the text structure characteristics of expository and argumentative kinds of text (text organization), the so-called TexProF-Kit was developed. For each modul it contains the executive, and the characteristics of expository and argumentative text means and aids for supporting the subjects' learning process. When writing texts the TexProF-Kit was used as an external support for the subjects' production of text. Subjects worked with the kit all over the intervention, including all of its writing sessions. Last but not least, the kit also served as a help for students' internalization of the trained process- and product-oriented aspects of the intervention.
In addition, in the middle of the intervention a professional writer modeled how he produces text. What he said about producing text was related by members of the research group to the subprocesses of writing distinguished in the "Orchestra Model" of Text Production. Further, in a role play type of game where each role represented one subprocess of writing according to the "Orchestra Model" of Text Production, modeling of the subprocesses of writing and coordination of them by an executive was provided by members of the research group. (By the end of the training, subjects played this game themselves.) In addition, reflections on process and product (expository and argumentative text) characteristics were conducted throughout the intervention. To support subjects' motivation and to provide feedback from a real-live audience for them, a public presentation with a real audience (invited peers, teachers, parents) of the best texts written by the subjects was arranged.
Almost all the time students worked in pairs (cooperative learning). In addition, most of the time each pair was accompanied by one member of the research group who understood him/herself as a mentor respectively a tutor who, on request, gave advice related to the specific writing task being worked on by the pair, and to whom questions concerning process and product of writing in general could be asked. Finally, every time a text was being written, the members of a pair were requested to anticipate with each other what they were going to do next within the writing process, what kind of mental activity this step consisted of, and to observe how much time the pair would spend on each specific step. Each pair continuously protocolled their writing activities and their duration in minutes in what we called a driver's respectively writer's logbook.
All this was done in order to support metacognitive thoughts as well as to make a representation available of the mental processes gone through by the pair for the discussion of its decisions and activities with the mentor. Reflections on writing problems of general interest and possible solutions for them took place in plenum discussions.
The **product-oriented training** provided subjects with main characteristics (text organization) of expository and argumentation type of texts according to BONATI (1990). To support learning in the product-oriented training descriptions of the characteristics of expository and argumentation type

of texts were provided on cards which could be consulted during the production of either an expository or an argumentative text.

5. Measurement

In order to investigate the effects of the intervention, several tests and evaluation procedures were developed and applied:

(1) **VIGNETTE**: Vignettes provided subjects with problem situations which often occur in writing in order to see whether subjects would handle the problem situations differently after the intervention than before (declarative metacognitive knowledge): "In comparison to thinking-alouds or retrospective reports, the vignettes represent a viable means of eliciting information about metacognitive knowledge by asking students to discuss and demonstrate on concrete tasks what the hypothetical student should do and explain why ..." (ENGLERT et al. 1988, 21).

(2) **DYADIC INSTRUCTION**: Video-recording of a tutor's advice to a tutee in a dyadic text production situation allowed us to see how subjects who acted as tutors advised a tutee (a student from a parallel class which was not involved in the intervention) on how to cope with a text production task before and after the intervention (procedural metacognitive knowledge).

(3) **ESTIMATED PREWRITING TIME**: Dividing up a hypothetical amount of 100 minutes (= 100%) by naming the kind of activities within the overall writing process attention should be paid to, and estimating how much time should be allocated to each of the distinguished subprocesses.

(4) **REAL/EFFECTIVE PREWRITING TIME**: Measurement of the time being used by a writer before s/he starts to formulate surface structure sentences to provide data on whether subjects allocated more time for prewriting activities after the intervention.

(5) **QUALITY OF A TEXT PRODUCT**: Evaluation of the quality of compositions which were written before and after the intervention also examined the intervention effect.

(6) **BRAND EMOTION SCALE FOR WRITER**: Data of the Brand Emotion Scale for Writers (BRAND 1984) which was translated into German language and was applied at the beginning of the sessions in which the pre- and post-test compositions were written gave insight into possible influences of the intervention on students' emotions in writing.

(7) **QUESTIONNAIRE**: A questionaire containing questions about what students find difficult, respectively not difficult concerning the production of texts at school were administered in order to judge the intervention's influence in this respect.

(8) **ACHIEVMENT MOTIVATION TEST**: Finally, an achievment motivation test was administered at the beginning of the intervention.

Tests and evaluation procedures (1) - (7) were used before and after the intervention.

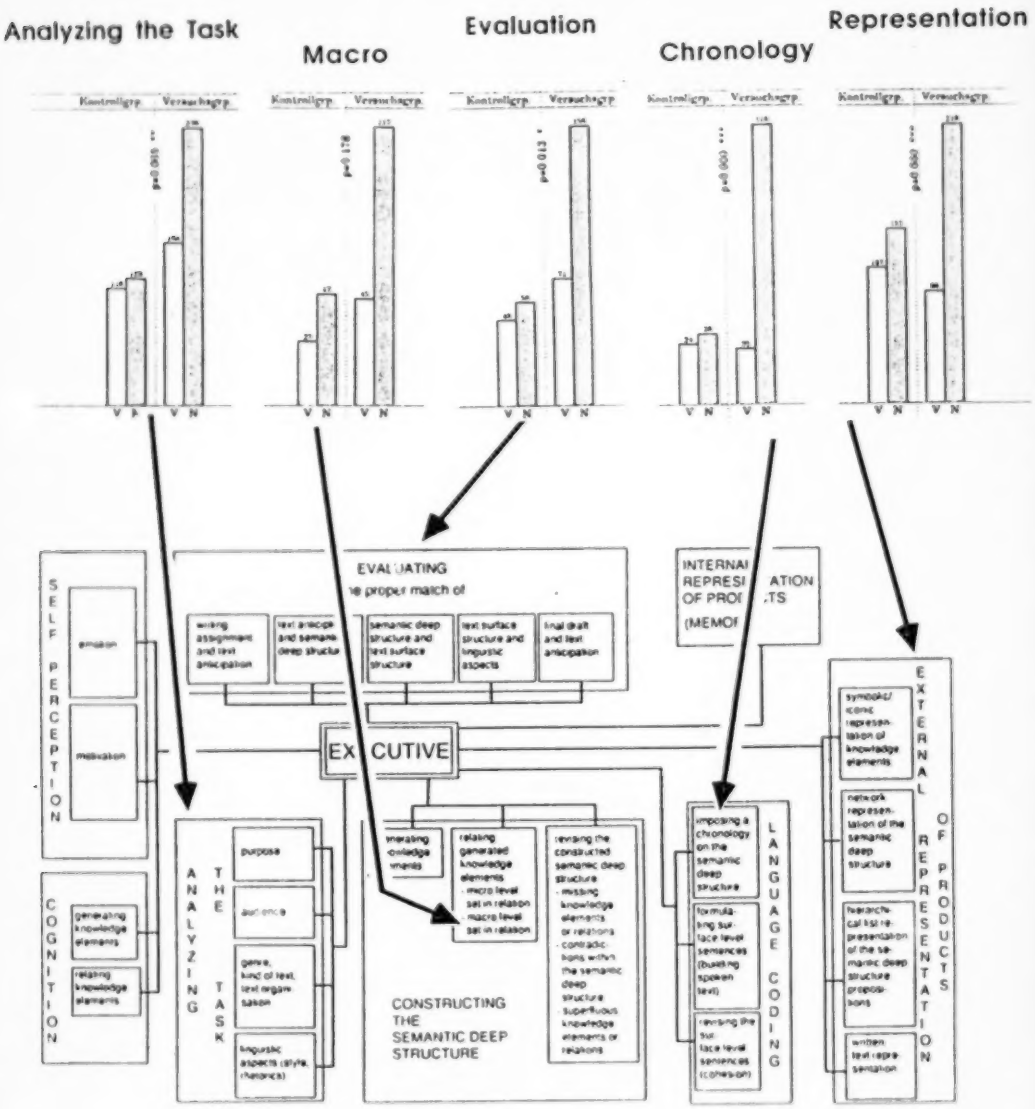
6. Results

The results to measurements (1) - (4) only are presented below.

Measurement 1 Vignettes: Declarative Knowledge

Vignettes provided subjects with problem situations which often occur in writing in order to see whether subjects would handle the problem situations differently after the intervention than before.

Translation
Kontrollgrp = Control Group / Versuchsgrp = Experimental Group / V = Vortest = Pretest / N = Nachtest = Post-test

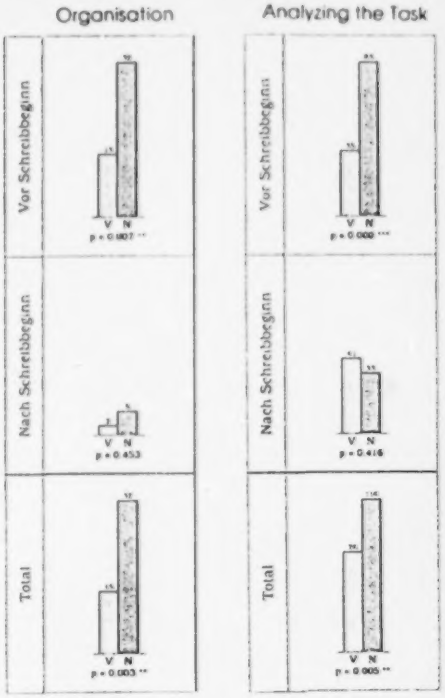


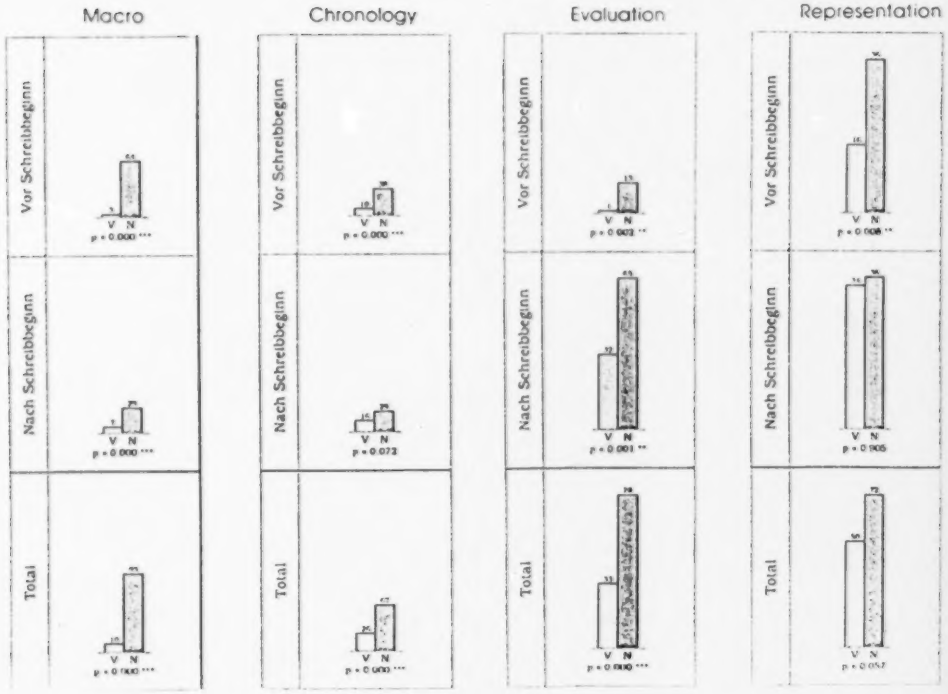
BEST COPY AVAILABLE

Measurement 2 Diade: Procedural Knowledge

Translation: Vor Schreibbeginn = prewriting Nach Schreibbeginn = while writing
Kontrollgrp = Control Group / Versuchsgrp = Experimental Group / V = Vortest = Pretest / N = Nachtest = Post-test

DIADIC INSTRUCTION: Video-recording of a tutor's advice to a tutee in a dyadic text production situation allowed us to see how subjects who acted as tutors advised a tutee (a student from a parallel class which was not involved in the intervention) on how to cope with a text production task before and after the intervention (procedural metacognitive knowledge).





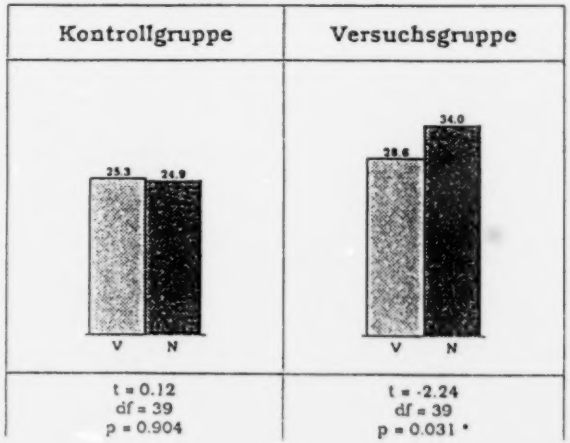
Measurement 3

Measurement 4

Translation:
Kontrollgruppe = Control Group / Versuchsgruppe = Experimental Group / V = Pretest / N = Post-test

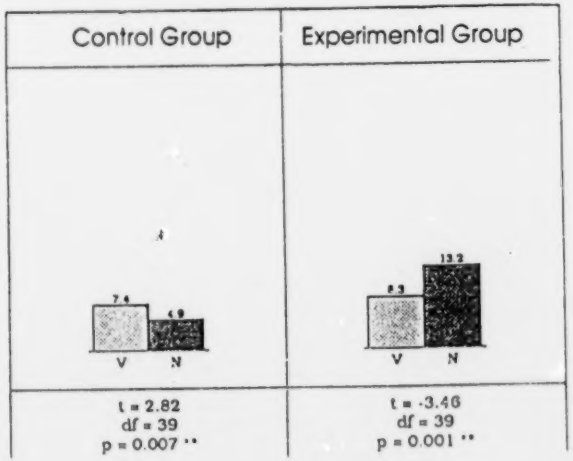
estimated prewriting time

Dividing up a hypothetical amount of 100 minutes by naming the kind of activities within the overall writing process attention should be paid to, and by estimating how much time should be allocated to each of the distinguished subprocesses.



effective/real prewriting time

Measurement of the time being used by a writer before s/he starts to formulate surface structure sentences provided data on whether subjects allocated more time for prewriting activities after the intervention.



7. Conclusion

Subjects who participated in the intervention dispose of a much better metacognitive knowledge base of text production (declarative knowledge) than subjects of the control group. Their views on how to organize the writing process significantly approached those of adult expert writers. In terms of the "Orchestra Model" of Text Production, subjects of the intervention group pay significantly more attention to (1) the analysis of the writing task, (2) the construction of the semantic deep structure, (especially the global or text related macro structural set in relations instead of local or sentence related micro structural set in relations which take place when the propositions underlying surface level sentences are constructed). Other improvements concern (3) the imposition of a chronology on the semantic deep structure, (4) the repertoire of external representation means for representing intermediate results of the text production process, and (5) the evaluation of the evolving text. Subjects of the intervention group not only possess more elaborate declarative knowledge, but they actually applied it in real writing situations as well (procedural knowledge). Firstly, in a dyadic instruction situation supervised by the experimenters, subjects of the intervention group made use of their acquired metacognitive knowledge while advising a tutee on how to cope with a text production task. Secondly, their time for prewriting activities is significantly longer than that of the control group, both estimated and effective. However, left on their own the subjects of the intervention group did not make as much use of their new knowledge as they did under supervision, as results not presented in this paper show, indicating that still more training in the autonomous application of available metacognitive knowledge is needed than was possible in the time allowed for the intervention by the involved high schools.

8. Bibliography

BAER, M. (1989) *Diagnose und Förderung der Textproduktionskompetenz von Schülern, unter Berücksichtigung kognitiver und metakognitiver Prozesse* (Projekt-Nr 11-27673.89 des Schweizerischen Nationalfonds zur Förderung der wissenschaftlichen Forschung). University of Berne, Institute of Education, Department APP.

BAER, M. (1992) *Fortsetzungsgesuch zum Projekt Diagnose und Förderung der Textproduktionskompetenz von Schülern, unter Berücksichtigung kognitiver und metakognitiver Prozesse* (Projekt-Nr 11-33540.92 des Schweizerischen Nationalfonds zur Förderung der wissenschaftlichen Forschung). University of Berne, Institute of Education, Department APP.

BAER, M., HOLLENSTEIN, A., HOFSTETTER, M., FUCHS, M & REBER-WYSS, M. (1993) *How Do Expert and Novice Writers Differ in Their Knowledge of the Writing Process and Its Regulation (Metacognition) From Each Other, and What Are the Differences in Metacognitive Knowledge Between Writers of Different Ages?*. Paper presented at 5th Conference of European

Association for Research on Learning and Instruction (EARLI), Aix-en-Provence, France, August 31 - September 5, 1993.

BONATI, P. (1990) *Schreiben und Handeln.* Aarau (Switzerland): Sauerländer.

ENGLERT, C.S., RAPHAEL, T.E., FEAR, K.L. & ANDERSON, L.M. (1988) Students' metacognitive knowledge about how to write infromational texts. *Learning Disability Quarterly, 11,* 18-46.

JECHLE, T. (1992) *Kommunikatives Schreiben.* Prozess und Entwicklung aus der Sicht kognitiver Schreibforschung. Tübingen (Germany): Script Oralia.

WINTER, A. (1992) *Metakognition beim Textproduzieren.* Tübingen (Germany): Gunter Narr Verlag.

For more detailled results write to:

Matthias Baer
Abteilung Paedagogische Psychologie (APP)
University of Berne
Muesmattstrasse 27

CH-3012 Berne

Switzerland

e-mail: BAER@APP.UNIBE.CH
Fax: (Switzerland) + 31 + 631 3773